intersecting with the passages of other pairs. The specimen-introduction passage 4 is formed hook-shaped to reduce the area of the chip 2.

The other substrate 2a has through holes serving as an anode reservoir 8a, a cathode reservoir 8c, a specimen reservoir 8s, and a waste reservoir 8w at the positions corresponding to the ends of the passages 4 and 6. The reservoirs 8c, 8s, and 8w are provided for each pair of the passages 4 and 6. The anode reservoir 8a is common on the side of one end of the separation passage 6 of each pair on the side of the pivot in the sector-shape arrangement.

The chip 2 is used in a state where both of its substrates 2a and 2b are connected on one another. In the chip 2, a position where a separated specimen is detected is near one end of the separation passage 6 of each pair on the side of the pivot in a sector-shaped arrangement.

When measurement is conducted by mounting the chip 2 on such an electrophoretic apparatus as shown in FIG. 5, the electrode 107 of the apparatus needs to be provided corresponding to the arrangement of the reservoirs 8a, 8c, 8s, and 8w. Furthermore, as for the detecting optical system 105, for example, along an optical path between the reflecting mirror 91 and the dichroic mirror 93 must be provided with such a beam scanning element as a galvano-mirror or AOD to thereby scan an excited light at a linear detection position, and the spectroscopic element 97, the lens 99 and the CCD 101 must be changed to those enabling detecting while discriminating between the eight separation passages 6.

By using, in electrophoresis, the electrophoretic apparatus shown in FIG. 5 thus modified corresponding to chip 2, it is possible to use the monitor optical system 89 to monitor a specimen distribution in the specimen-introduction passage 4 and the electrophoretic migration of the specimen toward the separation passage 6.

FIG. 9 is a graph illustration for showing a detection signal obtained when the specimen is labeled with four kinds of fluorescent materials with different wavelengths and separated and detected by the chip 2. The horizontal axis (x-axis) indicates the No. (channel No.) of the separation passage 6 and the

vertical axis (y-axis), four kinds of spectra. In FIG. 9, the detection signals of the four separation passages 6 are indicated.

In FIG. 9, a circle gives an intensity of a separated fluorescent light at a detected position thereof. The black circle, the dotted circle and the white circle indicate the intensities of the detection signals in order of intensity in each channel.

Different specimens are injected into the specimen reservoirs 8s of the chip 2 and a voltage is applied to these reservoirs to thereby guide these specimens to the intersection between the specimen-introduction passage 4 and the separation passage 6 of each pair and then apply electrophoretic voltages on these reservoirs, thus injecting the specimens present at the intersection into the separation passage 6. In each of the separation passages 6, the specimen is separated and electrophoretically migrates toward the anode reservoir 8a. The specimen components that were separated and arrived at the detection position are identified using the four kinds of fluorescent materials.

FIG. 10 is a schematic configuration diagram for showing another embodiment of the electrophoretic apparatus of the invention. The electrophoretic chip 1 shown in FIG. 10 is the same as that shown in FIG. 2. The same elements as those of FIG. 5 are indicated by the same reference numerals and so omitted in description.

On the chip 1 is held the chip holding station (not shown). The excitation light-source laser device 71, the beam expander 73, the CPU 103, the separation-peak detecting optical system 105 (including the reflecting mirror 91, the dichroic mirror 93, the objective lens 95, the spectroscopic element 97, the lens 99 and the CCD 101), the electrode 107 and the high-voltage supplying part 109 are the same as those of the embodiment of FIG. 5. The electrodes 107 corresponding to the specimen reservoir and the waste reservoir are omitted in the figure. Also, the reflecting mirror 91 may be omitted to inject an excited light from the beam expander 73 directly to the dichroic mirror 93.

An LED 119 is disposed as the excitation light-source at a position corresponding to an intersection between the specimen-introduction passage 11 and the separation passage 13 on the surface side of the chip 1. As the LED 119 a blue LED, for example, may be used with an oscillation frequency of 480 nm. The

LED used in the invention, however, is not limited to a blue one and such an LED that emits other colors, that is, lights of other wavelengths may be used.

The spectroscopic filter 81 is disposed at a position corresponding to the intersection between the specimen-introduction passage 11 and the separation passage 13 on the back side surface of the chip 1. The spectroscopic filter 81 transmits only such a light component that has a predetermined fluorescent wavelength of a fluorescent light from around the intersection 10 of the chip 1. The specifications of the spectroscopic filter 81 are determined by the fluorescent material used in labeling of the specimen and the wavelength of an excited light emitted by the LED 119.

Along an optical path for the fluorescent light, which passed through the spectroscopic filter 81, is provided the lens 83 for focusing, for image formation, the fluorescent light on a light receiving surface of the CCD 85.

To the CCD 85 is connected the CPU 87 for controlling the operations of the CCD 85 and processing its detection signal.

The LED 119, the spectroscopic filter 81, the lens 83 and the CCD 85 constitute a specimen-injection monitor optical system 89a. The monitor optical system 89a detects a fluorescent label around the intersection between the specimen-introduction passage 11 and the separation passage 13 of the chip 1 to thereby detect a specimen distribution in the passages 11 and 13 near the intersection.

The LED 119, the monitor optical system 89a, and the CPU 87 constitute the specimen-injection monitor mechanism.

In this embodiment, when a voltage is being applied on the reservoirs to guide a specimen injected in the specimen reservoir to the intersection, the LED 119 is turned ON to then use the monitor optical system 89a in order to monitor a specimen distribution in the specimen-introduction passage 11, especially, around the intersection between the specimen-introduction passage 11 and the separation passage 13. This enables, like in the embodiment of FIG. 5, deciding whether a sufficient amount of the specimen is already introduced to the intersection, thus improving the reliability of the measurement result.